

AC 2008-1964: ENGINEERING STUDENTS WITH DISABILITIES IN THE KINGDOM OF JORDAN

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Engineering Students with Disabilities in the Kingdom of Jordan

Abstract

Disabled students do not tend to join engineering programs in general. In the Kingdom of Jordan, only fifteen out of more than ten thousand engineering students are disabled. To understand the reasons behind this extremely low number, a study was conducted. The study included interviewing several disabled engineering students. It focused on why disabled students opt not to join engineering programs. The sample was small because the general population itself was small. It was observed that all of the disabled engineering students in Jordan have high academic standings. The interviewed students outlined some of the reasons behind the shortage of disabled students in engineering programs. They attributed this common phenomenon to their own choice as well as to the lack of support by those surrounding them. Several other observations, conclusions and recommendations were made accordingly to promote the engineering education process itself as well as the education of disabled students.

Introduction

Historically, disability in general and disabled students in particular have been almost totally ignored. It is only recently that this sector has received some attention from the rest of the society. This attention varies from country to country and even from one state to another within countries.

Besides its noble nature and its appeal as a sign of civilization, it is an obligation to integrate disabled individuals with the rest of the society. It is also extremely important to protect their rightful and intrinsic rights and to create equal opportunities for them. This issue should continue to receive full attention from everyone to highlight all of its aspects and effects on our human society. It is the obligation of the whole society and not certain individuals or groups to promote the rights of disabled students.

Integrating disabled students with the society should be based on two basic fundamentals. First, disabled individuals have the abilities and willingness to learn, grow, work, and positively participate in and for their communities. This is true regardless of the severity of the disabilities they live with. Their potential should therefore be understood and utilized to benefit them as well as the rest of their communities. Second, disabled individuals are part of the society. They have the right to share all available recourses exactly like everyone else around them. Federal and local governments should include the needs of disabled individuals in their strategic planning and all other actions.

Many countries, especially in the west have recognized this and have adopted actual measures in this regard. The Kingdom of Jordan, a country in the Middle East with very limited recourses prides itself to be a leader in promoting fair treatments of individuals with disabilities in this part of the world. Jordan became the first and only Arab country to receive the Franklin Delano

Roosevelt International Disabilities Award. This award was presented to Jordan's King Abdullah II in 2005 by Anna Roosevelt, the granddaughter of President Roosevelt.

The Kingdom of Jordan incorporates a comprehensive treatment in its policies. It pays a lot of attention to individuals with special needs. Its policies promote disabled individuals to be both self dependent as well as active participants in the society. This paper is not on this very broad subject. Jordan's achievements with disabled individuals can be found in other literature and publications. The education of disabled students is the subject here, and the engineering education of disabled students in Jordan is its focus.

Education and Engineering Education of Disabled Students

Disabled students have recently been treated fairly well especially in the west. The US government has indeed facilitated the education of disabled students. Jordan has as well undertaken very positive steps in this regard. Many students with disabilities are indeed enrolling in fairly decent numbers in colleges and universities in both the US as well as Jordan.

Nonetheless, based on his own experience and personal observations while teaching engineering for many years in different US institutes, one of the authors noticed that very few disabled students opt to enroll in engineering education here in the US. This is despite the fact that many measures have been put in place by both federal and local governments to increase the number of disabled students across all education fields including engineering. The situation is even direr in Jordan. Another author who teaches students with special needs in a Jordanian institutes has noticed that disabled students rarely enroll in engineering education.

All of this prompted the authors to initiate an investigation on the engineering education of disabled students in Jordan. The aim of this study is to benefit disabled students and to promote engineering education. It makes use of the experience of an engineering educator who is originally from Jordan but taught for several years at US institutes, and the experience of another Jordanian educator who deals exclusively with Jordanian disabled students.

Engineering Education of Disabled Students in Jordan

Jordan has two types of universities like the US. There are state universities as well as private universities. As stated above, it became clear based on the personal teaching experience of the authors that very few disabled students enroll in engineering education programs in Jordan. However, general statements like this need to be supported by numbers.

After searching and meeting various university and government officials in Jordan especially in its capital Amman, it was found that over ten thousand students are currently enrolled in engineering all over Jordan. However and alarmingly, only 15 disabled students are among this group of more than ten thousand students. More alarmingly, all of these 15 students are enrolled in state universities and there are no students with disabilities in engineering programs in any private Jordanian institute. Further, all disabled students were with movement disabilities. There are no disabled engineering students with mental disabilities. Table 1 below lists these students along with their institutes and engineering fields. Only first names were listed here.

Table1. Disabled Engineering Students in Jordan

Student	Gender	Kind of Disability	Year of Enrollment	Institute	Engineering Field	Standing GPA (%)
Hamzah	Male	Movement	2007/2008	Hashemite University	Architectural	88%
Ahmad	Male	Movement	2007/2008	University of Jordan	Computer Eng.	83%
Israa	Female	Movement	2007/2008	University of Jordan	Computer Eng.	90%
Doaa	Female	Movement	2007/2008	University of Jordan	Architectural	90%
Mohannad	Male	Movement	2007/2008	University of Jordan	Computer Eng.	88%
Taqwa	Female	Movement	2007/2008	University of Jordan	Computer Eng.	88%
Rawan	Female	Movement	2006/2007	Hashemite University	Electrical and Computer Eng.	84%
Saaed	Male	Movement	2006/2007	Yarmouk University	Electrical	94%
Moaawiyah	Male	Movement	2006/2007	Yarmouk University	Communications Eng.	90%
Mahmood	Male	Movement	2006/2007	Yarmouk University	Computer Eng.	83%
Saeed	Male	Movement	2006/2007	University of Jordan	Architectural	82%
Shorooq	Female	Movement	2006/2007	University of Jordan	Industrial	92%
Baraah	Female	Movement	2006/2007	Mootah University	Computer Eng.	83%
Sameer	Male	Movement	2006/2007	University of Jordan	Computer Eng.	96%
Mohammed	Male	Movement	2006/2007	University of Science and Technology	Architectural	Not Available

The Importance of the Study

This study was launched to investigate the reasons behind the deficiency in terms of the number of disabled students in the engineering programs in Jordan. It is hoped that this study will provide information which can be used to achieve the following general long term goals:

1. Increasing the number of disabled students in all Jordanian Universities
2. Incorporating all disabled students needs in the strategic planning of all Jordanian universities.
3. Encourage disabled students to join engineering programs.

4. Understanding the reasons behind the lack of interest in engineering on the side of disabled students and trying to use this in a positive way.
5. Understanding how much disabled students know about their legal rights.
6. Providing faculty members with information needed to facilitate the engineering education of disabled students.
7. Initiating cooperation between US and Jordanian institutes of higher education to advance the engineering education of disabled students.

The Study

It was hoped that the investigators will interview all 15 disabled engineering students. However, due various administrative, practical, social, and personal reasons, not all of them participated in this study. The investigators personally interviewed four of these disabled students in their universities between December 25, 2007 and January 6, 2008.

The authors recognize that this number is small, and may not reveal an exact evaluation. However, the number of the disabled engineering students is 15 and it is in itself small. This study will however give at least some indications and general observations based on the imposed restrictions in this case.

Several questions were prepared as a list to be used in the interview. Several faculty members from various departments at the Al-Balqaa Applied University in Salt, Jordan were consulted to examine the suitability of these questions. Several suggestions were provided and were taken into account in preparing the final interview's questions.

Interview Questions

During the personal interview with each of the four participating disabled engineering students, the following list of questions was presented and the answers of the students were recorded. The students were asked to please list and expand on the following items and questions:

1. Your name
2. University
3. College
4. Engineering major
5. Year enrolled
6. Academic standing
7. Type of disability
8. Severity of disability
9. Academic standing in High School
10. Where do you live?
11. How do you come to the university?
12. How do you look at your disability?
13. What are the reasons for choosing the engineering field in your college education?
14. In your opinion, why do most disabled students stay away from enrolling in engineering fields?

15. What are the main obstacles which you face as an engineering disabled student?
16. What are your educational ambitions?
17. What do you expect from the others to facilitate the education of disabled students?
18. What is the role of the university to remove obstacles facing engineering education?
19. What is your role as a disabled university student in delivering your demands for your legal rights?
20. How much do you know about your legal rights and protection as a disabled college student?
21. What do you suggest to increase the number of disabled students in engineering programs?
22. What are the obstacles that you face when you perform the practical training part (internship) of the engineering education program? What are your suggestions to alleviate such obstacles?
23. What are the most difficult courses in the engineering curriculum? Are these courses affected because of you being a disabled student?
24. What are your extra curriculum activities?
25. Who, in your opinion, should be responsible to enforce the legal rights and protection of disabled students?
26. What are the obstacles you expect to face upon graduation and in the future beyond graduation?

Specific Goals of This Study:

As can be seen from the above list of questions, this study specifically aims at:

1. Knowing and understanding the main obstacles facing disabled engineering students in the universities of Jordan, and
2. Knowing and understanding the nature and characteristics of integrating disabled students with the rest of the students in the universities of Jordan.

Data Collection

The investigators contacted the Higher Council of Disabled Affairs and obtained the names of all disabled engineering students across Jordan. The investigators then contacted the universities in which these disabled students are enrolled. The universities facilitated interviewing these students. The two investigators then interviewed 4 out of the 15 disabled engineering students on a one on one basis. The answers to the interviews were then analyzed. Observations, conclusions, and recommendations were made accordingly.

Discussions, Observations, and Analysis

Despite the fact that this sample was small, it was a surprise to see that 40% of all disabled engineering students (those who were and who were not interviewed) in Jordan are female. It is an acceptable fact that all engineering programs across the world including the US have real difficulties attracting female students.

All of the 15 engineering disabled students have recently enrolled. None of them is from before the year 2006/2007. This is a positive sign indicating that disabled students are starting to be part of the engineering community.

It is safe to state that Jordanian professors and other professors who teach in Jordan are very tough on grading. Students have to work very hard to attain a good academic standing. The authors tend to believe that the main reason behind this is the desire of Jordanian institutes to establish themselves in the region as viable institutes of higher education. This seems to be true also in all countries in the region according to the limited experience of the authors. It was a delightful surprise to note that all disabled engineering students in Jordan have high academic standings. Sameer has an outstanding average of 96%, which is very difficult to attain in any institute in Jordan. The authors regret to state here that they did not ask the students about this specific observation and the reason behind this excel. It is perhaps attributed to the desire of the disabled students to prove that they are as good as anyone else in the society.

One third of the 15 students are majoring in Computer Engineering. Next in line is Architectural Engineering and Electrical Engineering. Perhaps, this is an indication that disabled students tend to join programs which do not require extensive physical movements. Only one student was in the Industrial Engineering program. None of the disabled students chose Civil or Mechanical Engineering. This is a further indication that disabled students avoid engineering majors which require a lot of physical activities.

The responses of the interviewed students about the nature of their disabilities varied. One student had amputated limbs while the left hand of another student was paralyzed. The third student was inflicted with children paralysis in his youth. The fourth student suffered paralysis in her lower limbs and uses a wheel chair.

Hamza from the Hashemite University indicated that disabled students avoid engineering programs because such programs require extensive efforts in terms of energy and time which disabled students do not have or are unavailable to him or her. Mohammed from the University of Science and Technology indicated that disabled students are not aware of the available engineering programs. According to him, disabled students believe that engineering programs are not available to disabled students and are reserved exclusively for normal students. Mohannad seems to agree with what the study shows. He indicated that almost all engineering programs require all types of physical activities (hands and legs) and this is the main reason behind the fact that a very limited number of disabled students join engineering programs. The only exceptions he noted were the computer and architectural engineering fields. In these fields according to him, students need only to use their hands and not their feet. Rawan, the only interviewed female student said that the main reason behind the shortage of disabled students in engineering programs was the difficulties a disabled student will face to find a job after graduation. She said that a disabled engineer will have a very small and limited chance to work.

Unlike Rawan, the other three students were very optimistic to find a decent job in offices with industrial companies and government agencies. However, they still fear that such employers will have second thoughts about hiring disabled engineers.

When asked about the obstacles they face in their education, the students pointed out the following items:

1. The distance between classrooms and university buildings are long. Disabled students arrive late to their classes accordingly.
2. It is extremely difficult to use stairs when elevators are out of service.
3. The difficulties associated with using part of their bodies (only one hand or part of one hand).
4. Some universities did not provide handicapped equipment in their rest rooms.
5. Transportation systems are not equipped at all to handle disabled students. Only students who have the financial ability to have special vans enroll in college.

All students indicated that all of their professors and instructors and peers have accepted them and they did not discriminate against them because of their disabilities. This also includes university officials and workers.

All students agreed that it is the responsibility of the disabled student to demand his/her rights. They indicated that it is the disabled student who needs to ask for solutions to his or her problems from university officials. However, all agreed that university officials do not respond as they should to disabled students' demands. They however were very polite and sensitive as they tried to justify these shortcomings by attributing this lack of attention to the fact that universities do not have enough resources and to the small number of disabled students.

It was noted that disabled students did not have mentors or special advisors. Such personnel in the opinion of the authors are needed to facilitate the enrollment of all disabled students in all programs and not only in the engineering field. This is especially true in the first year of the student's college life.

The response of the four interviewed students about the difference between state and private universities was unanimous. All of the interviewed students said it is because of the decent discount they receive from state universities, they do choose state over private universities. State universities offer up to 90% tuition waiver for disabled students.

The students from both genders indicated that being a disabled male or female does not make a difference.

It became clear that the internship requirements impose a lot of challenges to the disabled students. This part of the education requires the interaction with the industry from the side of the student. Disabled students do not have the resources and the energy to look for a company to work with for a few months. To exasperate the situation, engineering companies seem to be reluctant to cooperate in this regard.

Jordan Government's Role

As stated above, the government of Jordan has indeed put in place measures and started many initiatives to promote the education of disabled students. It pays attention to the engineering field in this regard as well. This includes:

1. Reserving specific number of seats exclusively for disabled students in engineering programs in all universities.
2. State universities offer up 90% tuition waiver for disabled students. Engineering programs are among the most expensive programs in Jordan.
3. Providing handicapped facilities in all new building in state universities
4. Establishing acts and decrees to protect the rights of disabled students.

Engineering Education of Disabled Students in Surrounding Countries

Disability strikes randomly and it does not recognize the existing man-made and geographical boundaries. Accordingly, the focus of the efforts to advance the education of disabled students should not be on one specific country for any reason. The authors would like to invite other educators in neighboring countries to conduct similar studies to explore the reasons behind the shortage of disabled students in engineering fields. Such comparative studies will be of great help to everyone involved in this process. Furthermore, various countries should cooperate positively in this regard.

Conclusions and Recommendations

Based on this investigation, a number of conclusions and recommendations can be made to promote both the rights of disabled students and engineering education as explained next.

It seems that the society is still ignorant on this issue. People should be made aware of the plight of disabled individuals in general and disabled students in particular. This can be done using different media like TV, radio channels, newspapers, magazines, and brochures.

All buildings in all universities should be modified to include what disabled students need. Special transportation modes should be provided to pick up students from and to their universities.

In engineering programs, the universities should appoint special counselors to help disabled students in their internship needs. These counselors should be the liaison between disabled students and the industry. Similarly, disabled engineering students should be helped upon graduation as well through the same mechanism.

Disabled students should meet periodically amongst themselves to identify the difficulties they face and how to alleviate them. They need to deliver such concerns to those who can help them. Universities should encourage and facilitate this type of meetings and pay attention to their outcome.

Private universities need to become an active participant in the promotion of the education of disabled students. To start with, these private institutes can offer decent discounts to disabled engineering students similar to what is being established in state universities.

International conferences should be convened to disseminate information about the obstacles standing in the face of disabled students in general and those in the engineering fields in particular. Various countries should cooperate amongst themselves in this regard as well.

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